REMARKS

Applicants acknowledge the indication of the allowability of the subject matter of claims 2 and 13 as set forth at page 6 of the Office Action. In addition, claim 8 depends from claim 2, and presumably, therefore, is also directed to allowable subject matter. In particular, claims 2 and 13 (and presumably claim 8) would be allowable if amended to place them in independent form. Nevertheless, for the reasons set forth hereinafter, Applicants respectfully submit that claims 2, 8 and 13 are allowable in their present dependent form.

Applicants acknowledge that this application is currently under Final Rejection. Nevertheless, entry of the foregoing Amendment under 37 C.F.R. §1.116 is appropriate in that the only change is the correction of a typographical error in the penultimate paragraph of claim 12, inserting the omitted word "unit." Accordingly, this amendment does not alter the scope of claim 12 or require further search, and Applicants request that it be entered in order to place claim 12 in better form for appeal.

Claims 1 and 3-12 have been rejected under 35 USC §103(a) as unpatentable over Benz *et al.* (U.S. Patent No. 6,186,066) in view of European Patent Application EP 0968958A1. However, as discussed in greater detail hereinbelow, Applicants respectfully submit that all claims of record in this application distinguish over the cited references, whether considered separately or in combination.

The present invention is directed to a method of operating a gas generating device. In particular, it provides a manner of operation which achieves improved cold starting properties. (That is, the device is quickly brought to an operating temperature at which it achieves its full capability for generating hydrogen gas.) For this purpose, the gas generating system includes at least two gas generating units, which are arranged sequentially in a gas flow path. During a starting operation, only the upstream gas generation unit is heated (by an external source), so that only that gas generation unit is operated. In order to hasten the heating of the first gas generation unit, during the starting phase, it is operated with a power, and/or at a temperature, that exceeds the rated power of the unit.

The Benz *et al.* reference, on the other hand, differs from the present invention in the following particulars:

(1) it does not disclose structure which forms a gas generating unit; and

(2) it does not provide that one of two gas generation units is operated during a cold start with a power output which exceeds its rated power.

These two differences are discussed sequentially hereinafter.

Gas Generation versus Heater

Gas generation, such as referred to in the present application (for example, a "reforming reaction"), is endothermic. It does not constitute, and is

not functionally equivalent to, "combustion", and requires a source of heat in order to sustain it. Such heat may be supplied by an electric source, by combustion or in any other manner.

The Benz *et al.* reference is directed to a device for providing heat energy -- that is, a "heater." The specification confirms this point at numerous places. Thus, for example, the Abstract indicates that it is a "device for providing heating energy to a gas-generating system." (It is apparent, of course, that there is a difference between such a device for providing heat, typified by Benz *et al.*, and the gas-generating system itself, such as that of the present invention.) Similarly, the specification at column 1, lines 6-7, states that the invention is directed to "a device for providing heat energy for a gas-generating system." At column 2, lines 40-41, the invention as depicted in Figure 1 is characterized as a "device for generating heat energy."

Accordingly, each of the three components 2-4 in Figure 1 (for example) constitutes a "combustion chamber" (column 2, line 45). (See also column 2, line 63; and column 3, lines 2-3, and 14-16.) The manifest purpose of such combustion is to provide heat energy. Thus, the Benz *et al.* apparatus provides a heating device which is suitable for use with a gas-generating system, to provide the heat necessary to support an endothermal gas generation process. The actual exhaust gas resulting from the combustion process in Benz *et al.* is treated as waste product, and is vented to the atmosphere (column 3, lines 31-33).

Applicants note in this regard, that the claims of the Benz *et al.* reference refer to a "gas-generating system" which includes a device for providing heat energy. However, the structure defined in each of the claims in Benz *et al* is clearly and expressly directed to a device for providing heat energy. Thus, for example, claim 1 recites that the "device for providing heat energy comprise[s]:" the elements shown, for example, in Figure 1. The gas-generating system itself is depicted nowhere in the figures of the drawing, nor is it, or its structure, discussed in the specification.

Operation at a Power Level above Rated Power

As is known to those skilled in the art, the capacity of a given gas generation unit to produce hydrogen gas (referred to as its "power" output) increases with its operating temperature, and the actual instantaneous power output at a given temperature is a function at the rate at which fuel is supplied (until, of course, the fuel supply exceeds the capacity of the unit). The specification of the present application defines the "rated power" of a gas generator as the amount of hydrogen gas that it is capable of producing "during prolonged operation at full load." See paragraph [0022]. Those skilled in the art will, of course, understand that the rated power of a gas generator is a function of its structure, including its volume, the material of which it is made, the quantity of catalyst provided, etc. Moreover, it will also be understood that, for a

particular gas generator, its "rated power" will have a corresponding rated temperature -- being the temperature at which the "rated power" is achieved.

It is, of course, apparent that a particular gas generator may be operated for short periods of time at a power output that it is incapable of sustaining over a prolonged period without incurring damage or deterioration -- that is, a power output that exceeds its "rated power." Such "overload" operation (paragraph [0024], lines 9-10) results in rapid heating of the gas generator unit. The present invention takes advantage of this phenomenon in order to provide an overall gas-generating system that is capable of rapidly achieving an operating temperature.

The penultimate paragraph in both claims 1 and 12 recites this feature of the invention. That is, claim 1 states, for example, that "during a starting phase of the gas generation device, ...only the first gas generation unit [is operated], with a power $P_{start\_1} > P_{rated\_1}$ or at an operating temperature $T_{start\_1} > T_{rated\_1}$." As noted previously, this feature of the invention is not taught or suggested in either of the cited references, Benz *et al.* and EP '958.

The "Response to Arguments" portion of the Office Action, at page 6, indicates that the specification does not define the term "rated power." Applicants respectfully submit, however, that the specification of the present application does define the meaning of this term, in, among other places, paragraph [0022], referred to previously and discussed above. As noted there, operation at a power greater than the "rated power" of the unit (as recited in the claims) simply means that the unit is operated at a power (or, correspondingly, a

temperature) which exceeds the ability of the unit to sustain over a long period of time. This is a concept which is well known to those skilled in the art.

The disclosure in Benz *et al.* at column 4, lines 1-4, does not teach this aspect of the invention. Rather, it simply notes that after the system has warmed up, the cold start component 3 is not operated at all (no fuel/air mixture is conducted through it). Since the output of the cold start unit during normal operation is thus zero, it follows that any level of operation during cold starting exceeds the actual level at which the cold start unit is operated (zero) when the system has been warmed up. This proposition is quite different, however, from stating that during cold starting, the cold start component 3 is operated "above its rated power," as defined in paragraph [0022]. Stated in other words, the fact that the cold start unit 3 is operated at zero power output during warmed up operation of the overall system, does not mean that its rated power is zero, which is the tacit premise of the statement set forth at the top of page 7 of the Office Action.

Nothing contained in EP '958 suggests such "overload" operation, or a modification of Benz *et al.*, which would replicate the present invention. Accordingly, for the reasons set forth above, Applicants respectfully submit that both of claims 1 and 12, and therefore all claims which remain of record, distinguish over the Benz *et al.* and EP '958 references.

If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 1748X/49969).

Respectfully submitted,

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